Natural Engineer
Version 4.4.2
Application Documentation
for Mainframes

Manual Order Number: NEE442-022MFR

This document applies to Natural Engineer version 4.4.2 and to all subsequent releases.

Specifications contained herein are subject to change, and these changes will be reported in subsequent revisions or editions.

Readers' comments are welcomed. Comments may be addressed to the Documentation Department at the address on the back cover. Internet users may send comments to the following e-mail address:

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Acknowledgements

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ABOUT THIS MANUAL

Purpose of this manual

This manual contains the Application Documentation for Natural Engineer.

It describes the various processes available that enable you to review your Natural applications within Natural Engineer.

The topics cover the Application options found under the Environment menu, which include:

- Field level interrogation using the Field Explorer option.
- Object Level interrogation using the Object Explorer options.
- An overview of the Object Quality reports available.

Target Audience

The target audience for this manual is intended to be any User of Natural Engineer at any level of experience.

Typographical Conventions used in this manual

The following conventions are used throughout this manual:

UPPERCASE TIMES	Commands, statements, names of programs and utilities referred to in text paragraphs appear in normal (Times) uppercase.
UPPERCASE BOLD COURIER	In illustrations or examples of commands, items in uppercase bold courier must be typed in as they appear.
< >	Items in angled brackets are placeholders for user-supplied information. For example, if asked to enter <file number>, you must type the number of the required file.
Underlined	Underlined parts of text are hyperlinks to other parts within the online source manual. This manual was written in MS-Word 97 using the "hyperlink" feature.

The following symbols are used for instructions:

⇒	Marks the beginning of an instruction set.
❑	Indicates that the instruction set consists of a single step.
1.	Indicates the first of a number of steps.

How this manual is organized

This manual is organized to reflect all the Application Documentation options of Natural Engineer in the following chapters:

Chapter	Contents
1	Describes the Field Explorer option, which provides the facility to review objects within applications loaded into the Repository at field level. This allows you to see the use of a field across the whole application as well as its use between objects.
2	Describes the various Object Explorer options, which provide the facility to review objects within each application loaded into the Repository at object level. The Object Explorer options review the inventory, structures, relationships, objects and source code within an application.
3	Describes the various Application Metrics options, which provide summary and detailed information about the application, objects and source code, for the purpose of providing structural statistics, quality and reliability information.

Terminology

It is assumed that you are familiar with general Natural and mainframe terminology, as well as the terms and concepts relating to Microsoft Windows operating systems. This section explains some terms that are specific to the Natural Engineer product.

Analysis

The Analysis process of Natural Engineer searches application data within the Natural Engineer Repository, according to specified Search Criteria and generates reports on the search results.

Application

An Application is a library or group of related libraries, which define a complete Application. In Natural Engineer, the Application can have a one-to-one relationship with a single library of the same name, or a library of a different name, as well as related steplibs. The Application refers to all the source code from these libraries, which Natural Engineer loads into the Repository.

Browser

An Internet Browser such as Microsoft Internet Explorer or Netscape.

Category

Categories in Natural Engineer specify whether and how a Modification is applied to the Natural code. Valid categories are: Automatic change, Manual change, Reject the default Modification, No change to the data item, and the data item is in Generated Code.

A category is further broken down according to type of change (for example: Keyword, Literal, Data Item, Database Access, Definition).

Consistency

An option in the Analysis process that causes Natural Engineer to trace an Impact through the code, using left and right argument resolution to identify further code impacted by the code found.

Environment

The Environment process is the means by which Natural Engineer generates a structured view of the application code in the Natural Engineer Repository. This provides application analysis reports and inventory information on the application and is used as the basis for Impact Analysis.

Exception

An Exception is an Item identified as impacted that does not require a Modification. Where there are a few similar Exception Items, they can be treated as Exceptions, and rejected in the Modification review process. Where there are many similar (therefore not Exceptions), consideration should be given to changing the Search Criteria so they are not identified as impacted in the first place.

Generated Code

This is code which has been generated by a Natural code generator, such as Construct, and which is not normally modified directly in the Natural editor.

Impact

An Impact is an instance of a Natural code Item; e.g., data item or statement (a “hit” scored by the Analysis process) that matches the defined Search Criteria used in the Analysis process.

Iteration

An Iteration is one examination cycle of a field identified according to the specified Search Criteria. For example, one Iteration is reading the field right to left. Multiple Iterations are performed when the option of ‘Consistency’ or Multi Search is requested for Analysis, and Natural Engineer performs as many Iterations as necessary to exhaust all possibilities of expressing and tracing the field, and can be limited by a setting in the NATENG.INI file.

Library

A single library of source code, which exists in the Natural system file.

Modification

A Modification is a change suggested or made to an object or data item resulting in the required compliance of that object or data item. Modifications in Natural Engineer are classified according to Category and Type.

Presentation Split Process

The Presentation Split Process is a sub-function of the Object Builder function that removes screen I/O statements from current application objects and places them in generated subprograms.

Soft Link

A Soft Link is where a link between two objects has been defined using an alphanumeric variable rather than a literal constant.

Technical Split Process

The Technical Split Process is a sub-function of the Object Builder function that results in the encapsulation of each database access within the application, into a sub-program so that the application is separated into 'presentation and logic' and 'database access'.

Type

The Type of Modification available, for example: Data Item, Keyword and Literal.

TLM

Text Logic Members are used to contain the code required to support inclusion of common code into the application. An example of this is the code to include into an application before updating a database.

Related Literature

The complete set of Natural Engineer manuals consists of:

1 **Natural Engineer Concepts and Facilities (NEE442-006ALL)**

The Concepts and Facilities manual describes the many application systems problems and solutions offered by Natural Engineer, providing some guidelines and usage that can be applied to Natural applications.

2 **Natural Engineer Release Notes (NEE442-008ALL)**

The Release Notes describe all the information relating to the new features, upgrades to existing functions and documentation updates that have been applied to Natural Engineer.

3 **Natural Engineer Installation Guide (NEE442-010ALL)**

The Installation Guide provides information on how to install Natural Engineer on both PC and mainframe platforms.

4 **Natural Engineer Administration Guide (NEE442-040WIN)**
Natural Engineer Administration Guide (NEE442-040MFR)

The Administration Guide provides information on all the various control settings available to control the usage of the different functions within Natural Engineer.

5 **Natural Engineer Application Management (NEE442-020WIN)**
Natural Engineer Application Management (NEE442-020MFR)

The Application Management manual describes all the functions required to add Natural applications into the Repository.

6 **Natural Engineer Application Documentation (NEE442-022WIN)**
Natural Engineer Application Documentation (NEE442-022MFR)

The Application Documentation manual describes all the available functions to document a Natural application within the Repository. These functions will help enhance / supplement any existing systems documentation such as BSD / CSD / Specifications etc.

7 **Natural Engineer Application Analysis and Modification (NEE442-023WIN)**
Natural Engineer Application Analysis and Modification (NEE442-023MFR)

The Application Analysis and Modification manual describes all the available functions to carry out analysis of Natural applications; including basic keyword searches. The modification process is described and detailed to show how it can be applied to modify single selected objects within a Natural application, or the entire Natural application in one single execution.

8 Natural Engineer Application Restructuring (NEE442-024WIN)
Natural Engineer Application Restructuring (NEE442-024MFR)

The Application Restructuring manual describes the analysis and modification functionality required to carryout some of the more sophisticated functions such as Object Builder.

9 Natural Engineer Utilities (NEE442-080WIN)
Natural Engineer Utilities (NEE442-080MFR)

The Utilities manual describes all the available utilities found within Natural Engineer and, when and how they should be used.

10 Natural Engineer Reporting (NEE442-025ALL)

The Reporting manual describes each of the reports available in detail, providing report layouts, how to trigger the report and when the report data becomes available. The various report-producing mediums within Natural Engineer are also described.

11 Natural Engineer Batch Processing [Mainframes] (NEE442-026MFR)

The Batch Processing manual describes the various batch jobs (JCL) and their functionality.

12 Natural Engineer WebStar (NWS442-020ALL)

The WebStar manual describes the concepts and facilities, installation and configuration options, how to web enable a Natural application and how to create and execute Natural Short Transactions using the Natural Engineer add-on component WebStar.

13 Natural Engineer WebStar Release Notes (NWS442-008ALL)

The Release Notes describe all the information relating to the new features, upgrades to existing functions and documentation updates that have been applied to the Natural Engineer add-on component WebStar.

14 Natural Engineer Messages and Codes (NEE442-060ALL)

The Messages and Codes manual describes the various messages and codes produced by Natural Engineer.

1

FIELD EXPLORER

Chapter Overview

This chapter describes the Field Explorer options available from the Environment menu.

Field Explorer provides the facility to review the applications loaded into the Repository at field level. This allows you to see the use of a field across the whole application as well as its use between objects.

The topics covered in this chapter:

1. Field Viewer.

Note: Natural Engineer refers to fields as data items or elements. Each of these are interchangeable terms for the same meaning, i.e., a field is a data item is an element.

Field Viewer

The Field Viewer option allows you to select and review information for individual data items within an object.

Field Viewer is accessed by selecting option '**F**' (Field Viewer) from the Environment Menu screen.

Field Viewer Elements Screen

The data items within an application that has been loaded into the Repository are listed on the Field Viewer Elements screen. Each data item can be selected to show a list of the objects referencing the selected data item. The following Figure 1-1 illustrates the Field Viewer Elements screen.

```
                        - Field Viewer Elements -  Application: HOSPITAL

                        Sel  Elements
                         _   #A
                         _   #C-ADDRESS
                         _   #C-ARRIVED
                         _   #C-DOB
                         _   #C-DUE-FOR-SURGERY
                         _   #C-FIRST-NAME
                         _   #C-GROUP
                         _   #C-PATIENT-ID
                         _   #C-RELEASED
                         _   #C-SELECTED
                         _   #C-SURNAME
                         _   #G-MESSAGE
                         _   #G-SELECTED-OPTION
                         _   #L-DAYS
                         _   #L-MESSAGE
                   Reposition: _____________________________

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit                   Prev  Next  FTyp             Main
```

Figure 1-1 Field Viewer Elements screen

SCREEN ITEMS	DESCRIPTION
Sel	This is the selection column where individual data items can be selected. Valid selections are: '**S**' Select element.
Elements	Lists all the data items within the application that has been loaded into the Repository.
Reposition	Reposition the list of data items starting from the new value entered. This value can be a complete data item name or part name using **'*'** wildcard. For Example: **' '** Will reposition at the start of the Element list. For the HOSPITAL system, this would start the element list from data item #A. **#M-MAP*** Will reposition at the first data item that matches the mask #M-MAP or is greater than the mask input. For the HOSPITAL system, this would start the element list from data item #M-MAP-HEADING. **BIRTH** Will reposition at the first data item that matches the mask exactly or is greater than the data item name input. For the HOSPITAL system, this would start the element list from data item CONTROL-DETAILS as data item BIRTH does not exist.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF9	Invoke the Field Type Selection pop-up window. Available selections are: ▪ **All Fields** ▪ **Non-Database Fields** ▪ **Database Fields** ▪ **System Variables**
PF12	Returns to the Natural Engineer Main Menu.

Field Viewer Objects Screen

After selecting a data item using option '**S**' from the Field Viewer Elements screen, the Field Viewer Objects screen is displayed, showing all the objects referencing the selected data item.

The following Figure 1-2 illustrates the Field Viewer Objects screen.

```
                        - Field Viewer Objects -    Application: HOSPITAL
                        Field: #C-DOB
    Stt   Format  Object                            XObject   Steplib
  _ 0011  C       XX021M01
  _ 0130  C       XX021P01
  _ 0011  C       XX022M01
  _ 0090  C       XX022P01

      Reposition: ________                      Object Types: DGLASNHMP3C4

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Types Exit                   Prev  Next                    Main
```

Figure 1-2 Field Viewer Objects screen

SCREEN ITEMS	DESCRIPTION
Field	The name of the selected data item.
Sel	This is the selection column where individual objects can be selected. Valid selections are: '**S**' Select object.
Stt	The Natural statement line number for the data item within the object.
Format	The Format and Length of the data item.
Object	The name of the object referencing the selected data item.

SCREEN ITEMS	DESCRIPTION
XObject	The name of the object that contains the definition, if the data item is defined externally, such as in a GDA or an LDA.
Steplib	The steplib library name of the object. Only applicable if the object referencing the data item is on a steplib library.
Reposition	Reposition the list of objects starting from the new value entered. This value can be a complete object name or part name using **'*'** wildcard. For Example: ***** Will reposition at the start of the Object list. For the HOSPITAL system, this would start the object list from object XXCONPDA. **XXE*** Will reposition at the first object name that matches the mask XXE or is greater than the mask input. For the HOSPITAL system, this would start the object list from object XXEXIT. **XX000G01** Will reposition at the first object name that matches the mask exactly or is greater than the object name input. For the HOSPITAL system, this would start the object list from object XX001L01 as object XX000G01 does not exist.
Object Types	Displays the object types to be referenced. Object types can be selected/de-selected by using '**PF2**' (Types). Available selections are: '**4**' Classes '**C**' Copycode '**D**' Data Definition Modules '**3**' Dialogs '**G**' Global Data Areas '**H**' Helproutines '**L**' Local Data Areas '**M**' Maps '**A**' Parameter Data Areas '**P**' Programs '**N**' Subprograms '**S**' Subroutines

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF2	Invoke the Object Type Selection pop-up window.
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Field Viewer Elements Usage Screen

After selecting an object using option '**S**' from the Field Viewer Objects screen, the Field Viewer Elements Usage screen is displayed, showing all the usage details for the selected data item within the selected object.

The following Figure 1-3 illustrates the Field Viewer Elements Usage screen.

```
                      - Field Viewer Element Usage - Application: HOSPITAL
     Object: XX021P01
      Field: #C-DOB
  Object   Stt  Source Code
  XX021P01 0130   02 #C-DOB(C)
  XX021P01 1580    MOVE (AD=I) TO #C-DOB









Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit                   Prev  Next                   Main
```

Figure 1-3 Field Viewer Elements Usage screen

SCREEN ITEMS	DESCRIPTION
Object	The name of the selected object.
Field	The name of the selected data item.
Object	The name of the object containing the Source Code.
Stt	The Natural statement line number for the data item within the object.
Source Code	The actual source code containing the selected data item reference.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF10	Scrolls screen display to the left. *Note: Only active if data exceeds standard screen size.*
PF11	Scrolls screen display to the right. *Note: Only active if data exceeds standard screen size.*
PF12	Returns to the Natural Engineer Main Menu.

2

OBJECT EXPLORER

Chapter Overview

This chapter describes the Object Explorer options available from the Environment menu.

Object Explorer provides the facility to review the applications loaded into the Repository at object level.

The Object Explorer option is accessed by selecting option '**B**' (Object Explorer) from the Environment Menu screen. This will display the Object Explorer sub menu screen.

The Object Explorer sub menu screen provides facilities for the user to review the inventory, structures, relationships, objects and source code loaded into the Repository.

The topics covered in this chapter:

1. Object Viewer
2. Object Documentation
3. Entry Point Structure Diagram

Object Viewer

The Object Viewer option allows you to select and review information for individual objects. Information will be displayed to show the data items within the object and the statements using those data items.

Object Viewer is accessed by selecting option '**O**' (Object Viewer) from the Object Explorer sub menu screen.

Object Viewer Objects Screen

The objects within an application that has been loaded into the Repository are listed on the Object Viewer Objects screen. Each object can be selected to show a list of the data items referenced within the selected object. The following Figure 2-1 illustrates the Object Viewer Objects screen.

```
                          - Object Viewer Objects -   Application: HOSPITAL
     Select     Object Name
        _       XX021L02
        _       XX021M01
        _       XX021P01
        _       XX022M01
        _       XX022P01
        _       XX023M01
        _       XX023P01
        _       XX024M01
        _       XX024P01
        _       XX025M01
        _       XX025P01




  Reposition -> ____________________________


Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Types Exit                    Prev  Next                    Main
```

Figure 2-1 Object Viewer Objects screen

SCREEN ITEMS	DESCRIPTION
Select	This is the selection column where individual objects can be selected. Valid selections are: '**S**' Select object.
Object Name	Lists all the objects in the application that have been loaded into the Repository.
Reposition	Reposition the list of objects starting from the new value entered. This value can be a complete object name or part name using **'*'** wildcard. For Example: ***** Will reposition at the start of the Object list. For the HOSPITAL system, this would start the object list from object XXCONPDA. **XXE*** Will reposition at the first object name that matches the mask XXE or is greater than the mask input. For the HOSPITAL system, this would start the object list from object XXEXIT. **XX000G01** Will reposition at the first object name that matches the mask exactly or is greater than the object name input. For the HOSPITAL system, this would start the object list from object XX001L01 as object XX000G01 does not exist.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF2	Invoke the Object Type Selection pop-up window. Available selections are: '**4**' Classes '**C**' Copycode '**D**' Data Definition Modules '**3**' Dialogs '**G**' Global Data Areas '**H**' Helproutines '**L**' Local Data Areas '**M**' Maps '**A**' Parameter Data Areas '**P**' Programs '**N**' Subprograms '**S**' Subroutines
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Object Viewer Elements Screen

After selecting an object using option '**S**' from the Object Viewer Objects screen, the Object Viewer Elements screen is displayed, showing all the data items referenced within the selected object.

The following Figure 2-2 illustrates the Object Viewer Elements screen.

```
                          - Object Viewer Elements -  Application: HOSPITAL

    Object: XX021P01 - Program
        Line Attr   Ext.Obj  Element Name
     _  0150 C               #C-GROUP.#C-ADDRESS
     _  0160 C               #C-GROUP.#C-ARRIVED
     _  0130 C               #C-GROUP.#C-DOB
     _  0170 C               #C-GROUP.#C-DUE-FOR-SURGERY
     _  0110 C               #C-GROUP.#C-FIRST-NAME
     _  0080 C               #C-GROUP
     _  0100 C               #C-GROUP.#C-PATIENT-ID
     _  0140 C               #C-GROUP.#C-RELEASED
     _  0120 C               #C-GROUP.#C-SURNAME
     _  0020 A070   XX000G00 #G-MESSAGE
     _  0010 A001   XX000G00 #G-SELECTED-OPTION
     _  0020 N002   XXMTHVAL #L-DAYS
     _  0010 A012   XXMTHVAL #L-MONTHS
     _  0450 N008            #L-TEMP-DATE
     _  0480 N006            #L-TEMP-DATE.#L-TEMP-DATE-N6

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
                 Exit                   Prev  Next                   Main
```

Figure 2-2 Object Viewer Elements screen

SCREEN ITEMS	DESCRIPTION
Object	The selected object name followed by the type of object applicable.
Sel	This is the selection column where individual objects can be selected. Valid selections are: '**S**' Select object.
Line	The Natural statement line number for the data item within the object.
Attr	The Format and Length of the data item.
Ext.Obj	The name of the object that contains the definition, if the data item is defined externally, such as in a GDA or an LDA.
Element Name	Lists all the data items referenced within the selected object.

PFKEYS	DESCRIPTION
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Object Viewer Element Usage Screen

After selecting a data item using option '**S**' from the Object Viewer Elements screen, the Object Viewer Element Usage screen is displayed, showing all the usage details for the selected data item within the selected object.

The following Figure 2-3 illustrates the Object Viewer Element Usage screen.

```
                      -Object Viewer Element Usage - Application: HOSPITAL
                                                              Page:   1
 Object: XX021P01
 Field : #L-TEMP-DATE
 Attr  : N008   Ext. Object:

 Stt   Keyword      Relation  Field Name
 0450  DEFINE                #L-TEMP-DATE
 0460  REDEFINE              #L-TEMP-DATE
 0650  MOVE         FROM      *DATN
 0650               TO        #L-TEMP-DATE









Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
                  Exit                    Prev  Next        Ctxt        Main
```

Figure 2-3 Object Viewer Element Usage screen

SCREEN ITEMS	DESCRIPTION
Object	The name of the selected object.
Field	The name of the selected data item.
Attr	The Format and Length of the data item.
Ext. Object	The name of the object that contains the definition, if the data item is defined externally, such as in a GDA or an LDA.
Stt	The Natural statement line number for the data item within the object.
Keyword	The Natural keyword that is applicable to each statement.
Relation	The type of relationship that is applicable to each statement.
Field Name	The data items that are applicable to each statement.

PFKEYS	DESCRIPTION
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF10	Invokes the Field Context List screen which shows the context of the selected data item within the data definitions of the selected object.
PF12	Returns to the Natural Engineer Main Menu.

Field Context List Screen

The context of any selected data item can be seen using the Field Context List screen, which displays the relationship of the selected data item within the data definitions of an object.

The Field Context List screen is invoked by using '**PF10**' (Ctxt) from the Object Viewer Element Usage screen.

The following Figure 2-4 illustrates the Field Context List screen.

```
                          - Field Context List -    Application: HOSPITAL

  Object: XX021P01                                          Page:   1
   Field: #L-TEMP-DATE
               STTNO Level Field Name                       Attr
               ----- ----- -------------------------------- ----
               0450   01   #L-TEMP-DATE                     N8
               0460   01   REDEFINE #L-TEMP-DATE
               0470   02   {FILLER}                         A2
               0480   02   #L-TEMP-DATE-N6                  N6









Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
                 Exit                    Prev  Next        Top         Main
```

Figure 2-4 Field Context List screen

SCREEN ITEMS	DESCRIPTION
Object	The name of the selected object.
Field	The name of the selected data item.
STTNO	The Natural statement line number within the data definitions of an object.
Level	The level number for each data item.
Field Name	The data item name.
Attr	The Format and Length of each data item.

PFKEYS	DESCRIPTION
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF10	Repostion to the top of the list.
PF12	Returns to the Natural Engineer Main Menu.

Object Documentation

The Object Documentation option allows you to view a concise overview of the major characteristics of an object.

Object Documentation Reports Selection Screen

The Object Documentation Reports Selection screen is accessed by selecting option '**D**' (Object Documentation) from the Object Explorer sub menu screen.

The Object Documentation option will produce a report for a single object, a range of objects or all objects within an application that has been loaded into the Repository. The report is produced by a batch job submitted using the NATRJE Job Submission screen, and can be found within the job output files.

The following Figure 2-5 illustrates the Object Documentation Reports Selection screen.

```
                          - Object Documentation -     Application: HOSPITAL
                             Reports Selection
                            Select    Object Name
                               _       XXCONPDA
                               _       XXCONUPD
                               _       XXEXIT
                               _       XXGETID
                               _       XXMTHVAL
                               _       XXTIDYUP
                               _       XXVALCC
                               _       XX000G00
                               _       XX001L01
                               _       XX001M01
                               _       XX001P01
                               _       XX002L01
                               _       XX002M01
                               _       XX002P01
                               _       XX021L01
                          Reposition -> ________
                    Object Selection -> ________  Object Types: GLASNHMP3C4
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Types Exit        Sub         Prev  Next              View  Main
```

Figure 2-5 Object Documentation Reports Selection screen

SCREEN ITEMS	DESCRIPTION
Select	This is the selection column where individual objects can be selected. Valid selections are: '**S**' Select object.
Object Name	Lists all the objects in the application that have been loaded into the Repository. This list can be tailored to your requirements using '**PF2**' (Types) option.
Reposition	Reposition the list of objects starting from the new value entered. This value can be a complete object name or part name using **'*'** wildcard. For Example: ***** Will reposition at the start of the Object list. For the HOSPITAL system, this would start the object list from object XXCONPDA. **XXE*** Will reposition at the first object name that matches the mask XXE or is greater than the mask input. For the HOSPITAL system, this would start the object list from object XXEXIT. **XX000G01** Will reposition at the first object name that matches the mask exactly or is greater than the object name input. For the HOSPITAL system, this would start the object list from object XX001L01 as object XX000G01 does not exist.
Object Selection	This will be the object or range of objects that will get reported on. There are three valid cases allowed: ***** Will produce Object Documentation reports for ALL objects in the current application. **XX001*** Will produce Object Documentation reports for ALL objects that have a name prefixed with XX001. For the HOSPITAL system this would be XX001L01, XX001M01 and XX001P01. **XX021P01** Will produce Object Documentation reports for object XX021P01 only.

SCREEN ITEMS	DESCRIPTION
Object Types	Displays the object types to be referenced. Object types can be selected/de-selected by using '**PF2**' (Types). Available selections are: '**4**' Classes '**C**' Copycode '**3**' Dialogs '**G**' Global Data Areas '**H**' Helproutines '**L**' Local Data Areas '**M**' Maps '**A**' Parameter Data Areas '**P**' Programs '**N**' Subprograms '**S**' Subroutines

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF2	Invoke the Object Type Selection pop-up window.
PF3	Exit from the current function and return to previous screen.
PF5	Invoke NATRJE Job Submission screen.
PF7	Displays previous page.
PF8	Displays next page.
PF11	Displays a pop-up window to select the sections to be included in the report. Sections that are reported are indicated by a 'Y'. There are some system defaults which will override any user selection: 1. Header Details are always shown. 2. Data Area and Text objects will show header details only. 3. Processing Rules will be shown on Map objects only. 4. Construct Details will be shown for objects generated using Natural Construct only. Sections available are:

PFKEYS	DESCRIPTION	
	Section	**Description**
	User Documentation	User specified comments for an object created via the User Documentation option. *Note: For more information on the User Documentation option, refer to Chapter 3 in the Natural Engineer Application Management for Mainframes manual.*
	Data Item Definitions	Globals; Independents; Parameters and Locals
	I/O	All input and output type statements.
	Database Access	All statements related to database access.
	External Calls	Any statements that result in processing to be invoked in objects outside the current object.
	Internal Subroutines	Any statements that invoke internal subroutines within an object.
	Processing Rules	Processing rules within a map.
	Construct Details	Any Construct Model and User Exit details.
PF12	Returns to the Natural Engineer Main Menu.	

After all the Object Documentation Reports Selection criteria have been specified, use '**PF5**' (Sub) to submit the batch job via the NATRJE Job Submission screen.

The following Figure 2-6 illustrates the NATRJE submission screen for the Object Documentation option.

```
                            - Job Submission -        Application: HOSPITAL

              Job Selection details
              ---------------------
                   Job Selected  : (REPDOC) OBJECT DOCUMENTATION

              Job Card details
              ----------------
                       Job Name  :  XGSLXX__
                       Job Class :  _


              Job Control Record details
              --------------------------
                              Control Status  :
              Last Job Submitted - Job Name    :
                                 - Opid        :
                                 - Step        :
                                 - Return Code :

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Sub   Ref               Rel               Main
```

Figure 2-6 NATRJE Job Submission screen

Note: For more information on the NATRJE Job Submission screen refer to the Natural Engineer Batch Processing (Mainframes) manual.

Object Characteristic Details Overview

The object characteristics that are displayed fall into three main categories:

1. User Documentation.

This section will always be shown for each object. It will detail any comments that have been specified using the User Documentation function in Natural Engineer. For Example:

User Documentation

Title: **XX001P01 – HOSPITAL system main menu**

Comments : **This program is the main executable for the HOSPITAL system. It will display the main menu showing the main functions available.**

Note: For more information on the User Documentation option, refer to Chapter 4 in the Natural Engineer Application Management for Mainframes manual.

2. Data Item Definition.

Globals	All external Global Data Area (GDA) objects used within the selected object will be listed. No individual global data items are shown. For Example: DEFINE DATA GLOBAL USING XX000G00. Would be displayed as: **Globals** **XX000G00**

Independents	All Application Independent Variables (AIV) will be shown. These will be the actual data items that have been defined using the INDEPENDENT clause. For Example: DEFINE DATA INDEPENDENT 01 +AIV-NAME (A25). Would be displayed as: **Independents** **+AIV-NAME**
Parameters	Both the external Parameter Data Area (PDA) objects and/or any internally defined parameter data items specified in an object under the PARAMETER clause. For Example: DEFINE DATA PARAMETER USING XXCONPDA PARAMETER 01 #EXTRA-PARM1 (A10). Would be displayed as: **Parameters** **XXCONPDA** **#EXTRA-PARM**
Local Using	All external Local Area (LDA) objects used within the selected object will be listed. No individual local data items are shown. For Example: DEFINE DATA LOCAL USING XX001L01. Would be displayed as: **Local Using** **XX001L01**

3. Object Procedural code details.

I/O	All input and output statements are reported. For Example: **I/O** **0020 INPUT #PARM-1 #PARM-2** **0100 INPUT USING MAP 'XX021M01'** **0190 REINPUT 'PLEASE ENTER A VALID ID'** **0330 WRITE 'FINANCIAL REPORT'** **0340 DISPLAY #EXPENDITURE 15T #TAX-VAL** **0590 PRINT 'END OF BATCH RUN'**
Database Access	All database access statements are reported. The order is by ascending statement line number within each view name. For Example: **Database Access** **EMP1 at 0520 by FIND (EMPLOYEES)** **EMP2 at 0990 by UPDATE (EMPLOYEES)** **VEH1 at 0700 by STORE (VEHICLES)** **VEH1 at 0740 by FIND (VEHICLES)** **VEH1 at 0810 by READ (VEHICLES)** **VEH1 at 0840 by GET (VEHICLES)**
External Calls	All references to external objects, such as programs, subprograms and subroutines. The order is by ascending statement line number within each external object. For Example: **External Calls** **XX002P01 by FETCH at 1100** **XX002P01 by FETCH at 1980** **XXCONUPD by CALLNAT at 1930** **XXEXIT by PERFORM at 1050** **XXGETID by CALLNAT at 0690** **XXVALCC by INCLUDE at 2160**

Internal Subroutines	Any references to internal subroutines within an object. The order is by ascending statement line number for each internal subroutine. For Example: **Internal Subroutines** **##DATE-FORMAT by PERFORM at 0550** **##DATE-FORMAT by PERFORM at 1020** **##TAX-CALC by PERFORM at 0700**
Processing Rules	Any processing rules found within maps. Both 'Free' and 'Automatic' rules are catered for. For Example: **Processing Rules** **Automatic Rule Rank 1 PERSONNEL-ID** **Automatic Rule Rank 1 BIRTH** **Free Rule Rank 0 *PF-KEY** **Free Rule Rank 0 #INPUT-NAME**
Construct Details	This section is only available for objects that have been generated using CONSTRUCT. It will show any Construct Model and User Exit information. For Example: **Construct Details** **Model: XX-BROWSE** **User Exit LOCAL-DATA from 0300 to 0500** **User Exit START-OF-PROGRAM from 0750 to 1000** **User Exit SET-PF-KEYS from 1995 to 2115**

Example Object Documentation Reports

To illustrate the Object Documentation process, an example is shown using the sample Natural application HOSPITAL.

This example will demonstrate the Object Documentation Reports Selection option to produce an Object Documentation report showing the object characteristics for program object XX002P01.

All the objects from the HOSPITAL application have been extracted and loaded into the Repository and the steps in this example start from the Object Documentation process.

Step 1 Open the Object Documentation Reports Selection screen by selecting option '**D**' from the Object Explorer sub-menu screen. From the list of objects select XX002P01 using '**S**' to select. This will put the object name XX002P01 into the Object Selection field.

The following Figure 2-7 illustrates the Object Documentation Reports Selection screen with object selected.

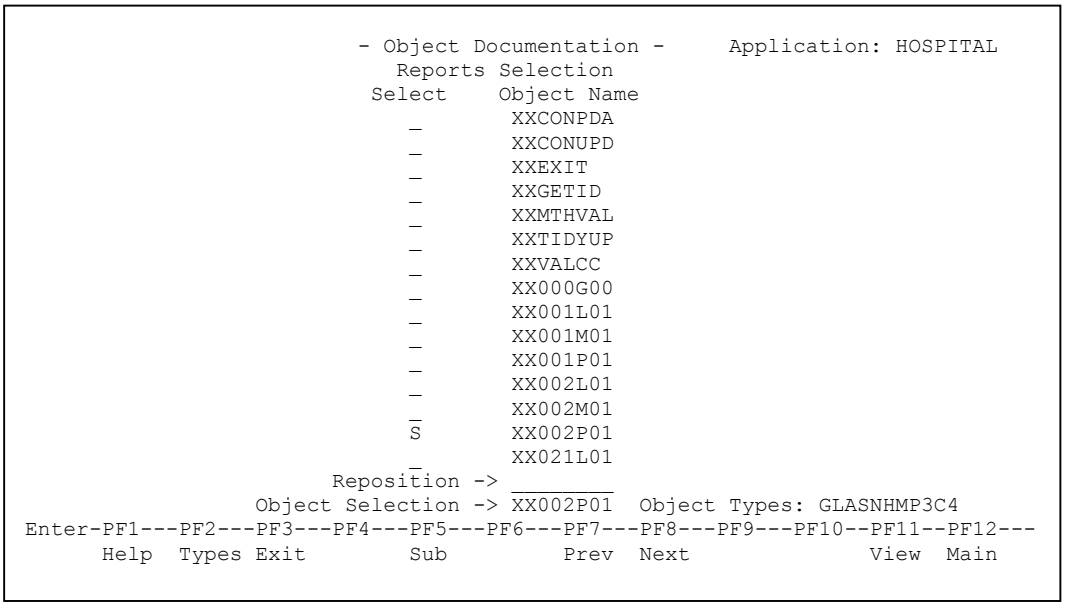

Figure 2-7 Object Documentation Reports Selection screen with object selected

Step 2 Check that all the View options are selected so that all the sections are available on the report. Use '**PF11**' (View) to invoke the pop-up Object Documentation Sections window. Check that all sections are marked with '**Y**'.

The following Figure 2-8 illustrates the Object Documentation Sections window with all options marked for inclusion.

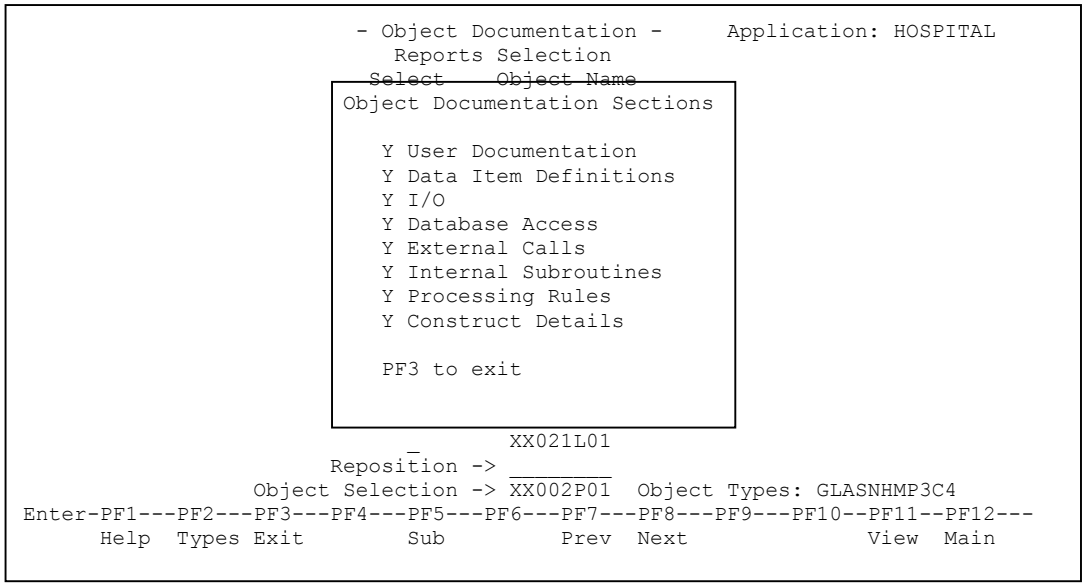

Figure 2-8 Object Documentation Sections window with all options marked for inclusion

Step 3 Use '**PF3**' (Exit) to close the Object Documentation Sections window. All report criteria are now specified.

Step 4 The Object Documentation report batch job can now be submitted by using '**PF5**' (Sub) from the Object Documentation Reports Selection screen.

The NATRJE Job Submission screen is displayed. After the correct Job Name and Job Class have been specified, the Object Documentation report batch job is submitted using '**PF5**' (Sub).

The following Figure 2-9 illustrates the NATRJE Job submission screen after the Object Documentation Report job has been submitted.

```
                          - Job Submission -        Application: HOSPITAL

             Job Selection details
             ---------------------
                  Job Selected  :  ((REPDOC) OBJECT DOCUMENTATION

             Job Card details
             ----------------
                      Job Name  :  XGSLXX01
                      Job Class :  X


             Job Control Record details
             --------------------------
                             Control Status  :
             Last Job Submitted - Job Name    :
                                - Opid        :
                                - Step        :
                                - Return Code :

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Sub   Ref               Rel               Main
Job : XGSLXX01 Submitted Successfully
```

Figure 2-9 NATRJE Job Submission screen after submitting job

Step 5 Once the job has completed, the Object Documentation report can be viewed from the job output file.

The following Figure 2-10 illustrates the Object Documentation report for object XX002P01.

```
Application:           HOSPITAL
Object Name:           XX002P01
Object Type:           Program
Object Mode:           Structured
Object Save Date:       16/06/1997 17:31:00
Object Catalog Date:    20/08/1998 12:56:00
Total Statement lines: 0031
Total Comment lines:   0007
User Documentation
   None
Data Item Definitions
Globals
   XX000G00
 Independents
   None
 Parameters
   None
 Local Using
   XX002L01
I/O
  0120 INPUT USING MAP "XX002M01"
Database Access
  None
External Calls
  XXEXIT (XXEXIT)  by PERFORM at 0200
  XX001P01 by FETCH at 0180
  XX021P01 by FETCH at 0250
  XX024P01 by FETCH at 0270
Internal Subroutines
  None
```

Figure 2-10 Object Documentation report for object XX002P01

Entry Point Structure Diagram

The Entry Point Structure Diagram option will provide a report with a tree structure view of an application.

This diagram will provide a tree structure view of an application showing the various inter-object activity, adding value to existing systems documentation for both development and production support tasks.

The process is initiated by defining Entry Points into an application, or into a technical or business function within an application, for documentation purposes.

The diagram starts with the entry point object and displays all other objects referenced by that object, and the objects referenced by those, and so on. Once an object has already been processed for an entry point and the same object is found within other entry point chains, then no further processing will be made for that object. The diagram will show the object name and be suffixed with ‘(Recursive)’.

Any missing objects (i.e., objects not loaded into the Repository) are shown with a suffix comment of ‘(Missing)’. Any objects that are from a steplib library are shown with a suffix comment of '(Steplib: "steplib library name")'.

It is possible to specify exclusions to prevent expansion of specified objects. Exclusions can be specified at object name and/or object type levels. Any object matching the exclusion criteria specified will be shown with a suffix comment of '(Excluded Object)' for object name exclusions, and '(Excluded Object Type)' for object type exclusions. Excluded objects will show no further entry point chains.

Further viewing refinements are available to limit the number of entry point chain levels displayed and whether exclusions are to be displayed or omitted from the diagram.

For each Entry Point Structure Diagram, a legend of the selected options used for the diagram is shown at the top.

Entry Point Diagram Screen

The Entry Point Diagram screen provides the facility to specify the main entry points within an application. Any objects to be excluded (Exclusions) can also be specified using this screen.

The Entry Point Structure Diagram screen is accessed by selecting option '**E**' (Entry Point Diagram) from the Object Explorer sub menu screen.

The following Figure 2-11 illustrates the Entry Point Diagram screen.

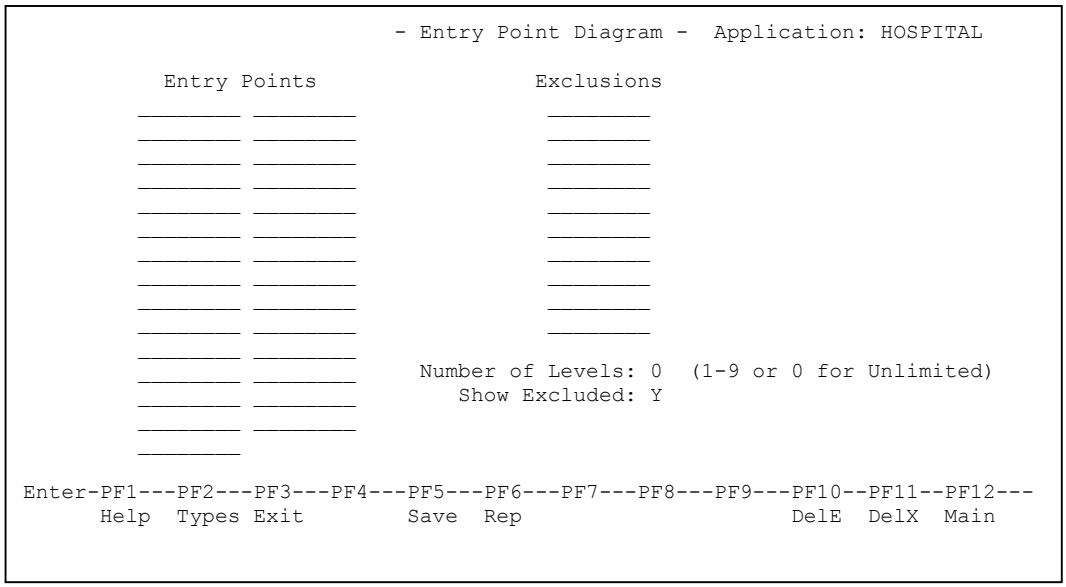

Figure 2-11 Entry Point Diagram screen

SCREEN ITEMS	DESCRIPTION
Entry Points	The object names to be used as the main entry points for an application. There is a maximum limit of 29 objects allowed.
Exclusions	Objects to be marked for exclusion are specified here. Object names can be complete names or part names using a wildcard of '*' (asterisk). For example: **XX021P01** Will exclude object XX021P01. **PRT*** Will exclude any objects whose name is prefixed with 'PRT'. There is a maximum limit of 10 objects allowed (part names using wildcards count as 1 object).
Number of Levels	This will set the number of levels to be processed. Possible selections are: **0** Show all levels. **1-9** Restrict the number of levels to the value selected.
Show Excluded	Controls the display of Entry Point Diagram exclusions. Valid selections are: '**Y**' Will display the excluded object on the diagram but no further relationship chain information for that object will be displayed. The object will be marked as '(Excluded Object)' for object name exclusions, and '(Excluded Object Type)' for object type exclusions. '**N**' The excluded object will not appear on the diagram.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF2	Specify exclusions by object type. Possible selections are: • **Classes** • **Dialogs** • **Helproutines** • **Maps** • **Programs** • **Subprograms** • **Subroutines**
PF3	Exit from the current function and return to previous screen.
PF5	Save the Entry Point and Exclusion details.
PF6	Invoke NATRJE Job submission screen.
PF10	Delete all Entry Points.
PF11	Delete all Exclusions.
PF12	Returns to the Natural Engineer Main Menu.

Once the required Entry Points and/or Exclusions have been specified, the Entry Point Structure Diagram report can be produced by using '**PF6**' (Rep) to submit the batch job via the NATRJE Job Submission screen.

The following Figure 2-12 illustrates the NATRJE submission screen for the Entry Point Structure Diagram report.

```
                          - Job Submission -        Application: HOSPITAL

             Job Selection details
             ---------------------
                  Job Selected  : (REPREP) APPLICATION REPORTS

             Job Card details
             ----------------
                      Job Name  :  XGSLXX__
                      Job Class :  _


             Job Control Record details
             --------------------------
                             Control Status  :
             Last Job Submitted - Job Name    :
                                - Opid        :
                                - Step        :
                                - Return Code :

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Sub   Ref               Rel               Main
```

Figure 2-12 NATRJE Job Submission screen

Note: For more information on the NATRJE Job Submission screen refer to the Natural Engineer Batch Processing (Mainframes) manual.

Entry Point Exclusions

As well as specifying the entry points within an application, it is possible to specify any objects you do not wish to have expanded on the Entry Point Diagram report.

This option allows you to tailor the reports to only show the relevant level of detail required. This prevents over crowded reports being produced when only a certain proportion of the system entry point chains is required.

Exclusions can be specified by object name and/or object type.

Object Name Exclusions

The Entry Point Diagram screen allows up to a maximum of 10 objects to be excluded from the diagram. Object names can be entered in full or using wildcard masks to identify groups of objects. For example:

1. **Exclusion object name** = '**XX021P01**' would result in object XX021P01 having no entry point chain being displayed for it. The diagram would show 'XX021P01 (Excluded Object)'.
2. **Exclusion object name** = '**PRT***' would result in all objects where their name is prefixed with PRT, having no entry point chains displayed. The diagram would show the object name followed by the '(Excluded Object)' suffix.

Object Type Exclusions

Object type exclusions will exclude all objects for a selected object type. Selections are made using the '**PF2**' (Types) option on the Entry Point Diagram screen. For example:

If object type **Maps** has been selected, then any map objects found in the entry point chain will show the map object name followed by the '(Excluded Object Type)' suffix.

Note: Objects that are excluded can be displayed or omitted from the Entry Point Diagram using the 'Show Excluded' option on the Entry Point Diagram screen. For more information refer to section Entry Point Diagram Screen.

Examples of Entry Point Structure Diagram

To illustrate the Entry Point Structure Diagram, two examples are shown using the sample Natural application HOSPITAL.

The two examples available are:

1. Simple Entry Point for the HOSPITAL application.
2. Add Entry Point Exclusions to the HOSPITAL application.

Example 1: Simple Entry Point for the HOSPITAL Application.

This example will run through the steps required to produce the Entry Point Structure Diagram for the sample Natural application HOSPITAL. The Entry Point will be set to XX001P01, which is the main menu program for the Hospital application.

Step 1 Open the Entry Point Structure Diagram option.

From the main Natural Engineer Menu screen select option '**E**' (Environment) to open the Environment Menu screen. From here, select option '**B**' (Object Explorer) to open the Object Explorer sub menu screen. From here, select option '**E**' (Entry Point Diagram) to open the Entry Point Diagram screen.

The following Figure 2-13 illustrates the Entry Point Diagram screen.

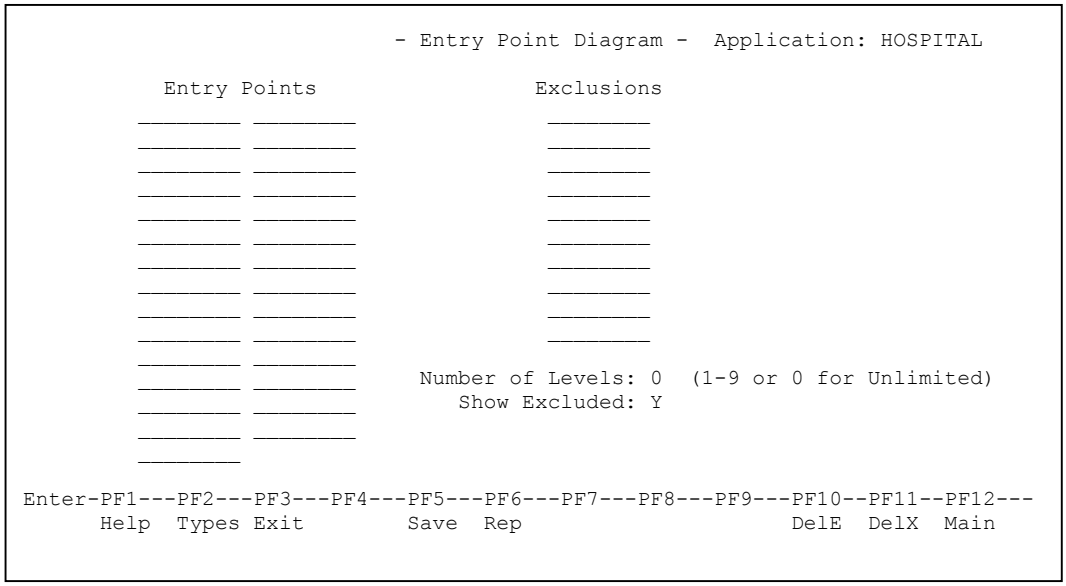

Figure 2-13 Entry Point Diagram screen

Step 2 Specify the Entry Point for the HOSPITAL system.

Input object **XX001P01** under the Entry Points column. Use '**PF5**' (Save) to save the Entry Points.

The following Figure 2-14 illustrates the Entry Point Diagram screen after object XX001P01 has been input and saved.

```
                          - Entry Point Diagram -  Application: HOSPITAL

          Entry Points                Exclusions
         XX001P01 ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________
         ________ ________     Number of Levels: 0  (1-9 or 0 for Unlimited)
         ________ ________        Show Excluded: Y
         ________ ________
         ________

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Types Exit        Save  Rep                     DelE  DelX  Main
Entry Point values saved.
```

Figure 2-14 Entry Point Diagram screen after object XX001P01 has been input and saved

The number of levels is set to 0 (unlimited) so that all entry point chains processed will be displayed. The Show excluded option is set to 'Y'.

Step 3 Submit the Entry Point Structure Diagram report batch job.

Use '**PF6**' (Rep) to submit the batch job. This will display the NATRJE Job Submission screen. After the correct Job Name and Job Class have been specified, the Entry Point Structure Diagram report batch job is submitted using '**PF5**' (Sub).

The following Figure 2-15 illustrates the NATRJE submission screen after the Entry Point Structure Diagram report batch job has been submitted.

```
                            - Job Submission -        Application: HOSPITAL

              Job Selection details
              ---------------------
                   Job Selected  : (REPREP) APPLICATION REPORTS

              Job Card details
              ----------------
                       Job Name  :  XGSLXX01
                       Job Class :  X


              Job Control Record details
              --------------------------
                              Control Status  :
              Last Job Submitted - Job Name    :
                                 - Opid        :
                                 - Step        :
                                 - Return Code :

 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
       Help        Exit        Sub   Ref               Rel               Main
Job : XGSLXX01 Submitted Successfully
```

Figure 2-15 NATRJE Job Submission screen after submitting job

Step 4 View the Entry Point Structure Diagram report.

Once the job has completed, the Entry Point Structure Diagram report can be viewed from the job output file.

The following Figure 2-16 illustrates the Entry Point Structure Diagram report for the HOSPITAL application.

```
          Entry Point Structure Diagram for HOSPITAL
Number of levels: Unlimited
HOSPITAL
  XX001P01(Program)
    XX001M01(Map)
    XXEXIT  (Subr)(XXEXIT)
    XX002P01(Program)
      XX002M01(Map)
      XX001P01(Program)(Recursive)
      XXEXIT  (Subr)(XXEXIT)
      XX021P01(Program)
        XXGETID (Subp)
        XX021M01(Map)
        XXEXIT  (Subr)(XXEXIT)
        XX002P01(Program)(Recursive)
        XXCONUPD(Subp)
      XX024P01(Program)
        XX024M01(Map)
        XXEXIT  (Subr)(XXEXIT)
        XX002P01(Program)(Recursive)
        XX023P01(Program)
          XX023M01(Map)
          XXEXIT  (Subr)(XXEXIT)
        XX025P01(Program)
          XX025M01(Map)
          XXEXIT  (Subr)(XXEXIT)
          XX021P01(Program)
            XXGETID (Subp)
            XX021M01(Map)
            XXEXIT  (Subr)(XXEXIT)
            XX002P01(Program)(Recursive)
            XXCONUPD(Subp)
    XX003P01(Missing)
```

Figure 2-16 Entry Point Structure Diagram for the HOSPITAL application

At the top of the diagram all the entry point display options used for this example are displayed.

From the diagram we can see that there is one missing object: **XX003P01**. Also objects **XX001P01** and **XX002P01** are marked as 'Recursive' in some of the lower entry point chains as they have already been expanded once in the report.

Example 2: Add Entry Point Exclusions to the HOSPITAL Application.

This example will run through the steps required to produce the Entry Point Diagram report for the sample Natural application HOSPITAL using object name and object type exclusions.

Object name exclusion will be specified to exclude any objects prefixed by '**XX02**'. This will result in objects **XX021P01** and **XX024P01** being excluded.

Object type exclusion will be specified to exclude any objects that are of type '**Subroutine**'. This will result in object **XXEXIT** being excluded.

This example follows on from Example 1.

Step 1 Open the Entry Point Exclusion screen.

From the main Natural Engineer Menu screen select option '**E**' (Environment) to open the Environment Menu screen. From here, select option '**B**' (Object Explorer) to open the Object Explorer sub menu screen. From here, select option '**E**' (Entry Point Diagram) to open the Entry Point Diagram screen.

The following Figure 2-17 illustrates the Entry Point Diagram screen with previously saved details.

```
                          - Entry Point Diagram -  Application: HOSPITAL

            Entry Points                 Exclusions
           XX001P01 ________               ________
           ________ ________               ________
           ________ ________               ________
           ________ ________               ________
           ________ ________               ________
           ________ ________               ________
           ________ ________               ________
           ________ ________               ________
           ________ ________               ________
           ________ ________               ________
           ________ ________
           ________ ________       Number of Levels: 0  (1-9 or 0 for Unlimited)
           ________ ________          Show Excluded: Y
           ________ ________
           ________

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Types Exit        Save  Rep                     DelE  DelX  Main
```

Figure 2-17 Entry Point Diagram screen with previously saved details

Step 2 Specify the object name exclusion.

Enter object name = **XX02*** under the Exclusions column. This will exclude any object in the HOSPITAL application that is prefixed with '**XX02**'.

The following Figure 2-18 illustrates the Entry Point Diagram screen after exclusion object name XX02* has been specified.

```
                          - Entry Point Diagram -  Application: HOSPITAL

          Entry Points                Exclusions
         XX001P01 ________             XX02*___
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________
         ________ ________       Number of Levels: 0  (1-9 or 0 for Unlimited)
         ________ ________          Show Excluded: Y
         ________ ________
         ________

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Types Exit        Save  Rep                     DelE  DelX  Main
```

Figure 2-18 Entry Point Diagram screen after exclusion object name XX02* has been specified

Step 3 Specify the object type exclusion.

Select '**PF2**' (Types) option from the Entry Point Diagram screen. This presents the Exclude Object Types pop-up window, where the object type '**Subroutine**' is selected using '**Y**'.

The following Figure 2-19 illustrates the object type 'Subroutine' selection

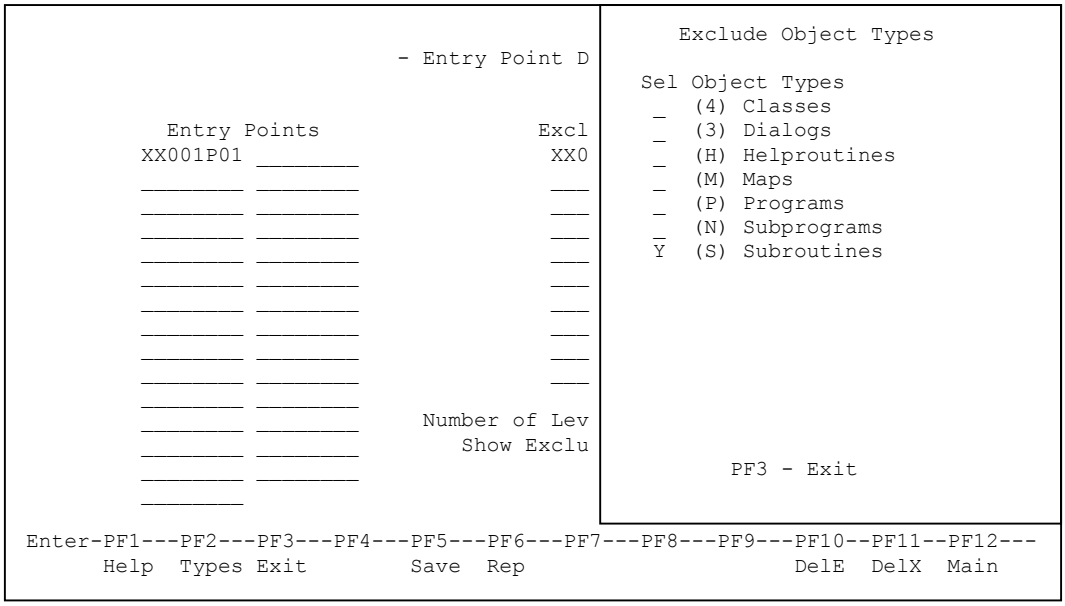

Figure 2-19 Object type 'Subroutine selection

Step 4 Check the viewing refinement options and save the Entry Points.

Use '**PF3**' (Exit) on the Exclude Object Type pop-up window to close it. This returns you to the Entry Point Diagram screen. The Number of Levels will be set to '**0**' (unlimited). The Show Excluded option is set to '**Y**' to show the excluded objects on the diagram.

The specified Entry Points and exclusions are saved using '**PF5**' (Save).

The following Figure 2-20 illustrates the Entry Points screen showing the viewing refinement options and the saving of the Entry Points.

```
                          - Entry Point Diagram -  Application: HOSPITAL

          Entry Points                Exclusions
         XX001P01 ________             XX02*___
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________             ________
         ________ ________
         ________ ________     Number of Levels: 0  (1-9 or 0 for Unlimited)
         ________ ________        Show Excluded: Y
         ________ ________
         ________

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Types Exit        Save  Rep                     DelE  DelX  Main
Entry Point values saved.
```

Figure 2-20 Entry Points screen viewing refinement options and the saving of the Entry Points

Step 5 Submit the Entry Point Structure Diagram report batch job.

Use '**PF6**' (Rep) to submit the batch job. This will display the NATRJE Job Submission screen. After the correct Job Name and Job Class have been specified, the Entry Point Structure Diagram report batch job is submitted using '**PF5**' (Sub).

The following Figure 2-21 illustrates the NATRJE submission screen after the Entry Point Structure Diagram report batch job has been submitted.

```
                            - Job Submission -        Application: HOSPITAL

              Job Selection details
              ---------------------
                   Job Selected  : (REPREP) APPLICATION REPORTS

              Job Card details
              ----------------
                       Job Name  :  XGSLXX01
                       Job Class :  X


              Job Control Record details
              --------------------------
                              Control Status  :
              Last Job Submitted - Job Name    :
                                 - Opid        :
                                 - Step        :
                                 - Return Code :

 Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
       Help        Exit        Sub   Ref               Rel               Main
Job : XGSLXX01 Submitted Successfully
```

Figure 2-21 NATRJE Job Submission screen after submitting job

Step 6 View the Entry Point Structure Diagram report.

Once the job has completed, the Entry Point Structure Diagram report can be viewed from the job output file.

The following Figure 2-22 illustrates the Entry Point Structure Diagram report with exclusions for the HOSPITAL application.

```
              Entry Point Structure Diagram for HOSPITAL
Number of levels: Unlimited
Exclude Object Types:
- Subroutine
Exclusions:
- XX02*
Exclusions Displayed
HOSPITAL
  XX001P01(Program)
    XX001M01(Map)
    XXEXIT  (Subr)(Excluded Object Type)
    XX002P01(Program)
      XX002M01(Map)
      XX001P01(Program)(Recursive)
      XXEXIT  (Subr)(Excluded Object Type)
      XX021P01(Program)(Excluded Object)
      XX024P01(Program)(Excluded Object)
    XX003P01(Missing)
```

Figure 2-22 Entry Point Structure Diagram with exclusions for the HOSPITAL application

At the top of the diagram all the entry point display options used for this example are displayed.

From the diagram we can see that objects **XX021P01** and **XX024P01** are marked as 'Excluded Object' as they meet the exclusion object name mask of '**XX02***'. Similarly, the objects **XX023P01** and **XX025P01** are not showing because they are within the exclusion object, entry point chain.

The subroutine **XXEXIT** is marked as 'Excluded Object Type' as it meets the exclusion object type '**Subroutine**'.

3

APPLICATION METRICS

Chapter Overview

This chapter describes the various reports available under the Application Metrics option found on the Environment menu.

The Application Metrics reports provide summary and detailed information about the application, objects and source code, for the purpose of providing structural statistics and quality information.

The Application Metrics option can be found using the Environment menu, which can be accessed using option '**E**' from the main Natural Engineer menu.

This chapter covers the following Application Metrics options:

1. **Reports**

This option provides textual measurement reports on object quality, reliability and maintainability. Object complexities are reported using industry standard complexity measurements such as Halstead and McCabe.

Reports

The Application Metrics Reports option will produce textual reports to show various measurement information on the objects within an application.

The Application Metrics Reports option is accessed by selecting option '**T**' (Application Metrics) from the Environment Menu screen.

There are six types of report available:

1. **Object Statistics**

The Object Statistics report provides summary and detailed information about the application, objects, and code, for the purpose of providing structural statistics e.g., Halstead and McCabe.

2. **Object Quality**

The Object Quality report provides information on the quality of an object.

3. **Object Reliability**

The Object Reliability report provides information on the reliability of an object.

4. **Object Maintenance**

The Object Maintenance report provides information on the maintainability of an object.

5. **Object Quality Summary**

The Object Quality Summary report shows a calculated value for an object's quality, against specified metrics.

6. **Object Reliability Summary**

The Object Reliability Summary report shows a calculated value for an object's reliability, against specified metrics.

Note: For more information on the Application Metrics reports refer to Chapter 3 in the Natural Engineer Reporting manual.

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